



***2020***

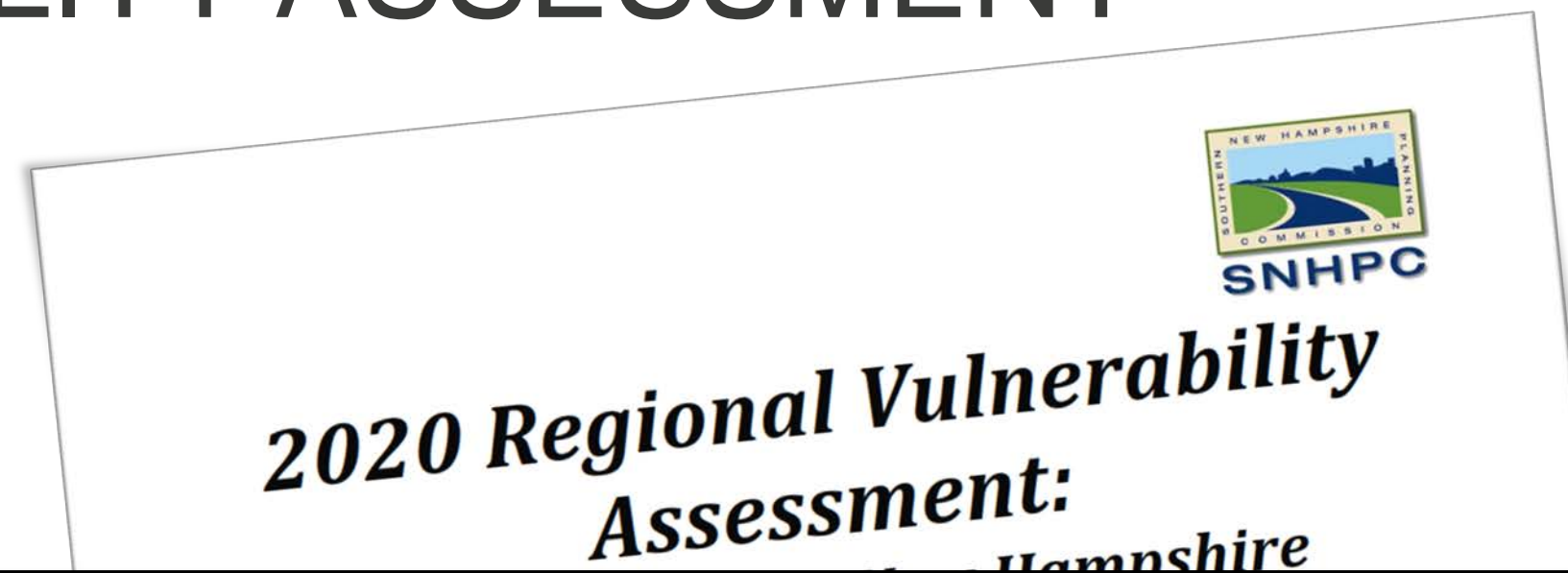
# **Regional Vulnerability Assessment**

## **Southern New Hampshire Planning Commission**

*Vulnerability Assessment Report Adoption, May 2020*

# VULNERABILITY ASSESSMENT

## FULL REPORT



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## Vulnerability Assessment

Risks posed by frequent precipitation events are increasing. Extreme precipitation events are becoming more frequent. SNHPC is conducting a vulnerability assessment of culverts and small bridges within the region to evaluate the risks associated with extreme precipitation events. Extreme precipitation causes inland flooding which is the most destructive type of historic weather pattern in the region. Such rainfall events continue to threaten the functioning of region's transportation network. To avoid and minimize disruptions to road networks and reduce the need for costly repairs under emergency conditions, vulnerabilities to the network need to be identified and a plan for adaptation and/or mitigation put in place. A working group was formed to address this need and developed a system for prioritizing culverts and small bridges based on sensitivity to and magnitude of risks posed to these assets.

This assessment and prioritization effort provide local communities and regional agencies with an additional decision-making tool to help them select adaptation and mitigation strategies for highest-

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Water overtopping culvert.



# VULNERABILITY ASSESSMENT

PROJECT PARTNERS



**NH SADES**  
**UNH T<sup>2</sup>**

## **Municipal Representatives**

**Engineering Staff & Road Agents**

## **State & Regional Technical Assistance**

**UNH T2, Homeland Security Emergency Management, NH Geological Survey**

## **Technical Guidance**

**UNH Sustainability Institute, NH Fish & Game, Trout Unlimited**



SOUTHERN NH  
PLANNING COMMISSION



# **Presentation Overview**

- 1. 2020 Vulnerability Assessment Report**
- 2. Comments on the Report**
- 3. Recommendation for Adoption**



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# VULNERABILITY ASSESSMENT

SCOPE OF WORK



## Assessment Activities

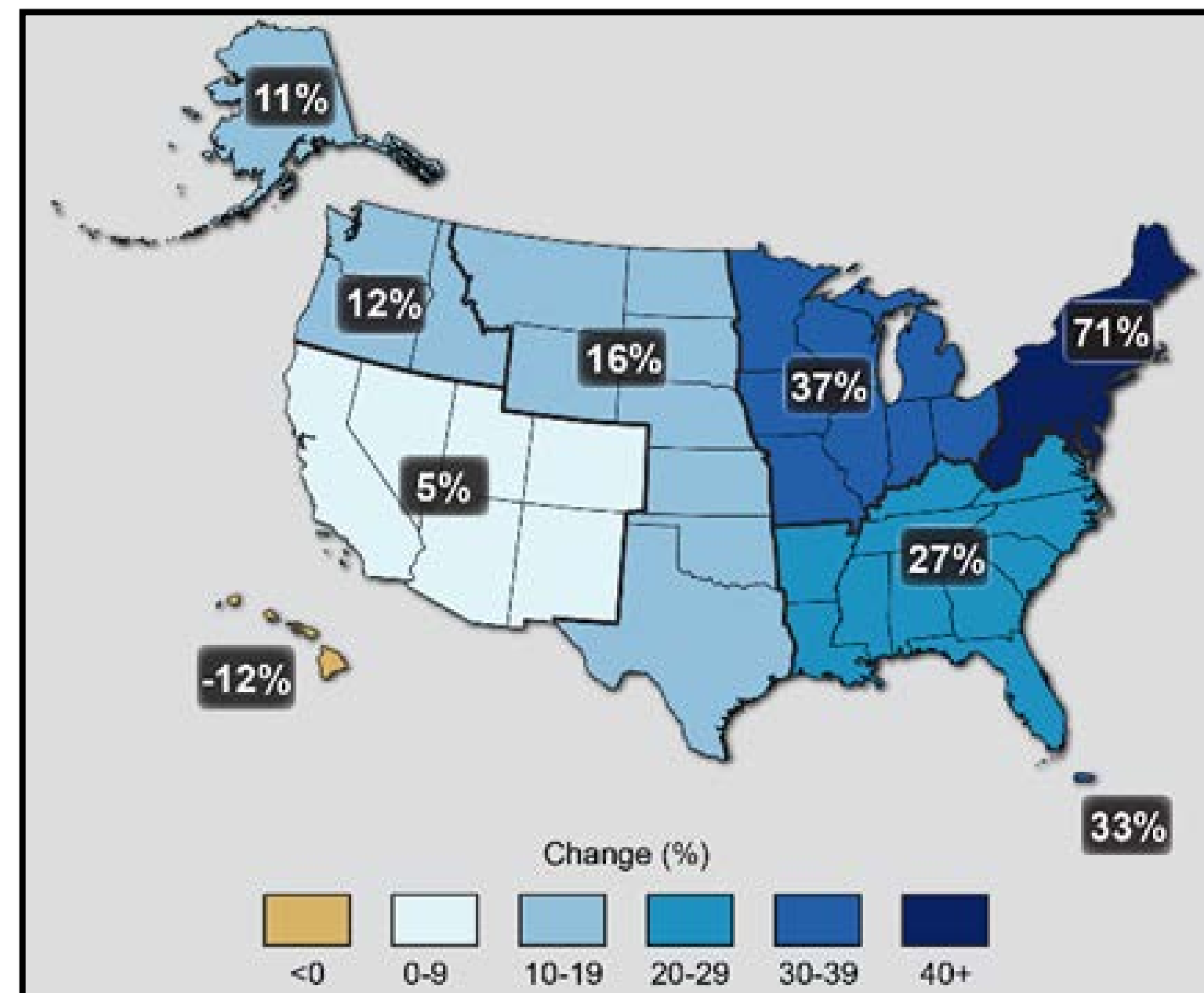
- **Stakeholder outreach and engagement**
- **Empirical climate and asset data collection**
- **Identification of possible impacts to road network**
- **Scoring of risk and prioritization of assets**
- **Identification of high-priority assets**
- **Adaptation and mitigation recommendations**

# VULNERABILITY ASSESSMENT

## SCOPE OF WORK



**Trending Weather:**  
An increase in frequency and intensity of heavy rainfall events.



**Increase in Very Heavy Precipitation 1958-2012**  
(defined as the heaviest 1% of all daily events.)





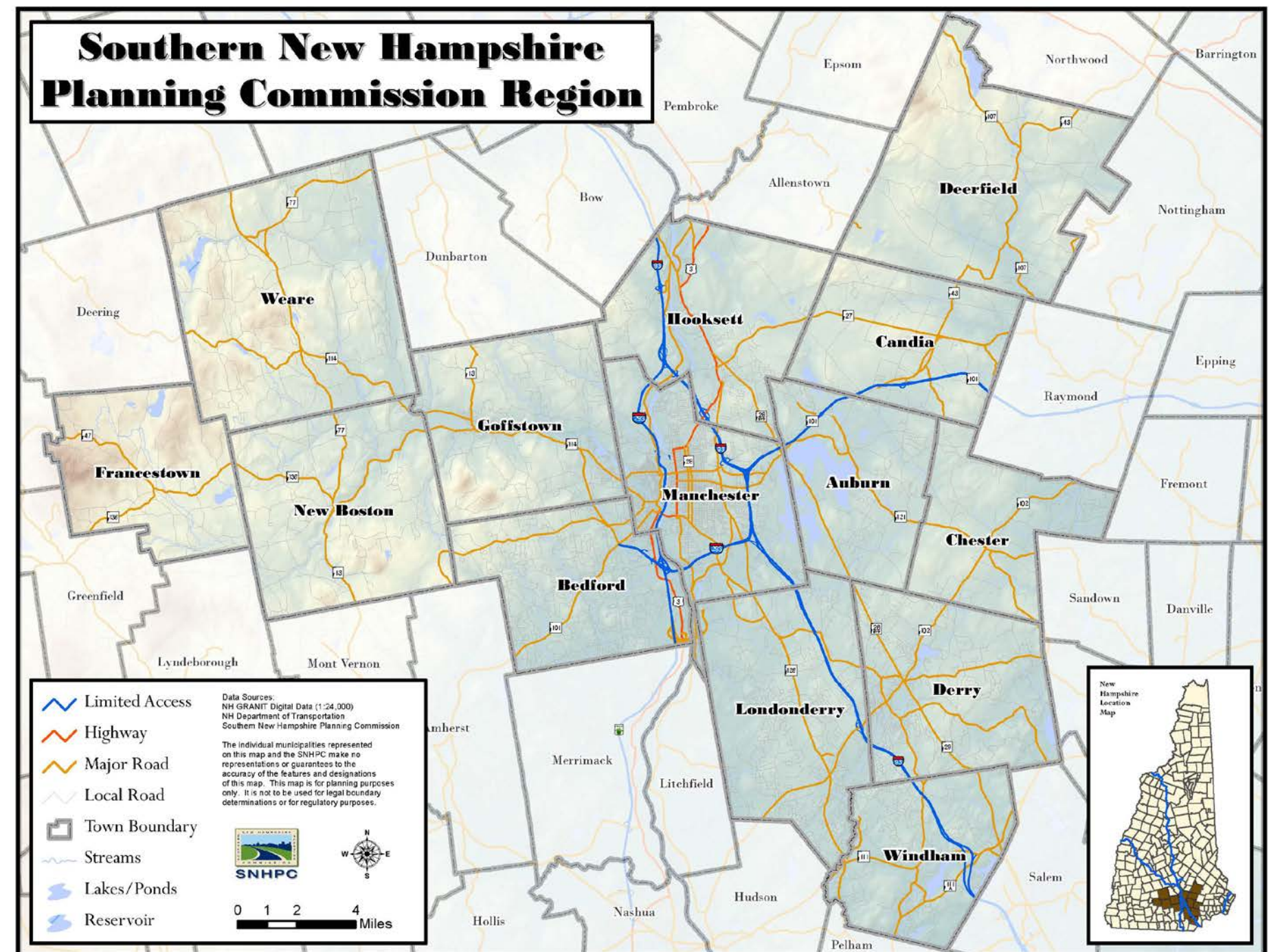
# VULNERABILITY ASSESSMENT

## SCOPE OF WORK



**Auburn**  
**Bedford**  
**Candia**  
**Chester**  
**Derry**  
**Deerfield**  
**Francestown**

**Goffstown**  
**Hooksett**  
**Londonderry**  
**Manchester**  
**New Boston**  
**Weare**  
**Windham**





# VULNERABILITY ASSESSMENT

SCOPE OF WORK



***Culverts & Small Bridges: Collectively referred to as “Stream Crossings”***





# VULNERABILITY ASSESSMENT

SCOPE OF WORK



## WHAT ARE THE RISKS POSED?

**More intense and increased frequency of heavy rainfall.**

- **Wash out of crossings.**
  - **Loss of road network connectivity.**
  - **Detours, Delays, and reductions in trips.**
  - **Increased costs through emergency repairs.**



# VULNERABILITY ASSESSMENT

## ACTIVITY OUTCOMES AND PRIORITIZATION RESULTS

<b>Road Segment Traffic Volume (NHDOT):</b>	10	Greater than 30k cars/day
	8	Between 20k and 30k cars/day
	6	Between 10k and 20k cars/day
	4	Between 5k and 10k cars/day
	2	Between 1k and 5k cars/day
	0	Less than 1k cars/day

<b>Stream Crossing Proximity to Flood Zone (FEMA):</b>	5	Within 100' of the floodway
	4	Within 100' of 100-yr flood zone
	3	Within 100' of 500-yr flood zone
	2	Within 100' of other flood zone
	0	Beyond 100' of any flood zone

<b>Hydraulic Vulnerability 10-Yr Storm (NHGS):</b>	5	Overtop
	4	Vulnerable
	3	Unknown (Data Missing)
	0	Not Applicable to Crossing Type
	0	Pass

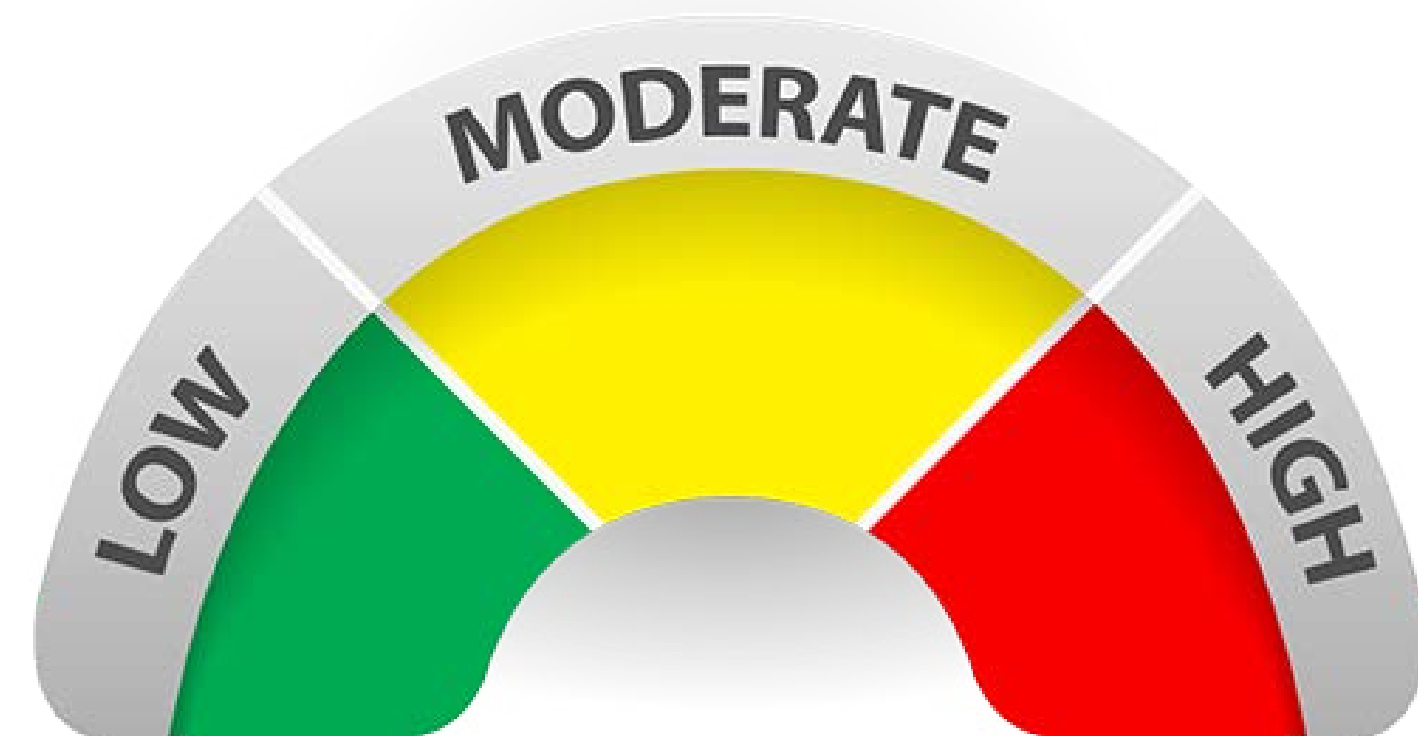
<b>Beaver Activity (SADES)</b>	2	Beaver Activity Documented
	0	No Activity Documented

<b>Structure Condition (SADES):</b>	10	Crossing in poor condition
	5	Crossing in fair condition (or unknown condition)
	0	Crossing in Good condition

<b>Struct. Matl. (SADES):</b>	2	Structure is metal
	0	Structure is not metal

<b>Local Flood Hazard (NHGS):</b>	5	Stream crossing within' 100 of flood hazards
	0	Stream crossing not within' 100' of flood hazards

<b>Asset Mngr. (SNHPC):</b>	10	Stream crossing ID'd
	0	Stream crossing not ID'd



Lowest possible score of "0"

*(85 crossings have a score of 0)*

Highest possible score of "49"

*(Top crossing score is 37)*

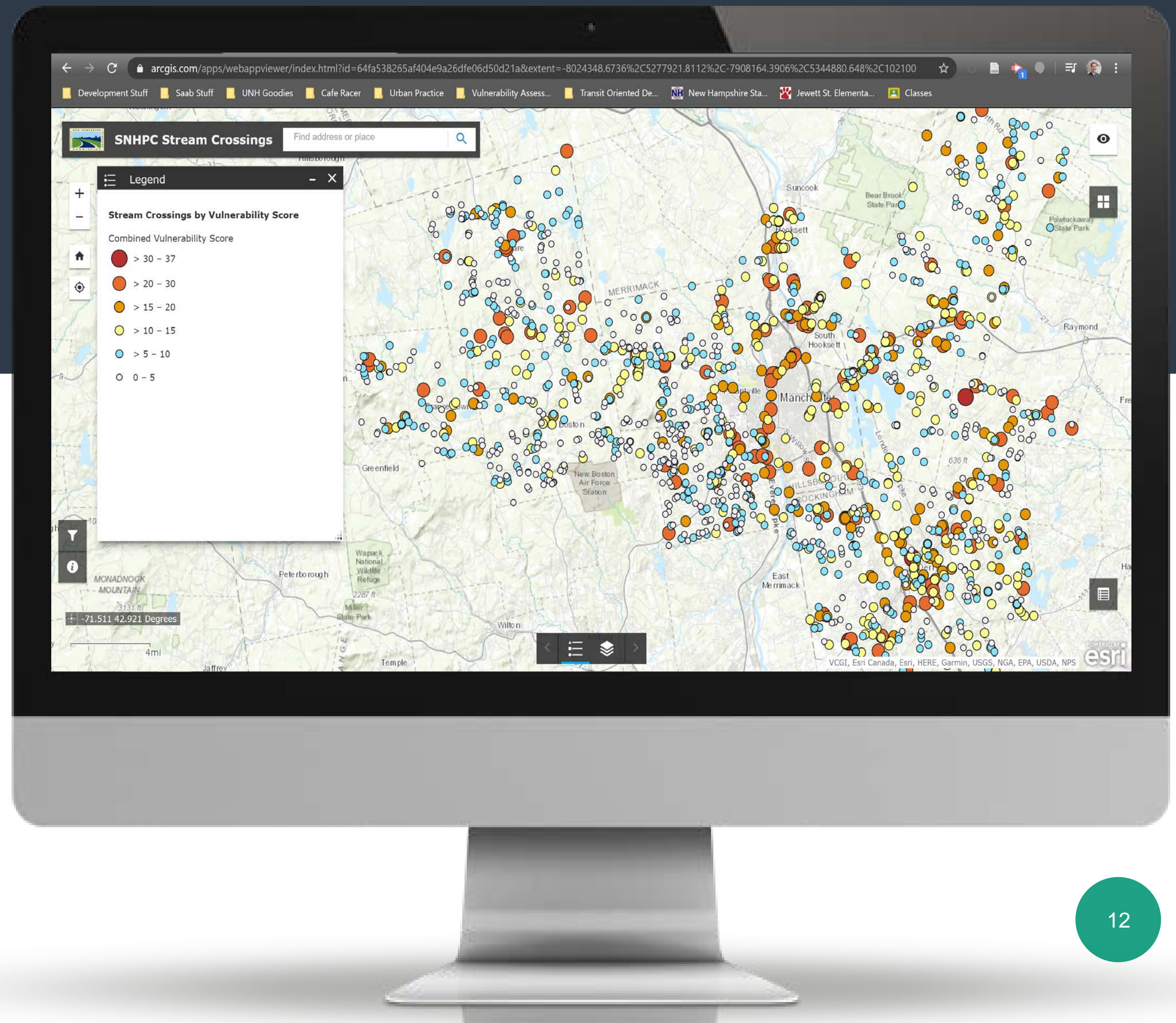




# VULNERABILITY ASSESSMENT

ACTIVITY OUTCOMES AND PRIORITIZATION RESULTS

[HTTPS://WWW.SNHPC.ORG/ENVIRONMENTAL-ENERGY-PLANNING/CLIMATE-ADAPTATION/PAGES/STREAM-CROSSING-GIS-MAP](https://www.snhpc.org/environmental-energy-planning/climate-adaptation/pages/stream-crossing-gis-map)



## ROBUST DATA

The SNHPC Region contains more than 1,500 stream crossings



## LOCAL ACCESS

The GIS data can be filtered by municipality, ownership, and crossing size.



## COLLABORATIVE

Map information can be used for coordination between municipal and state agencies.



## **REPORT RECOMMENDATIONS**

### **Municipal Recommendations:**

- Revise Online Stream Crossings Map Tool
  - Add New Filtering Functions Over Time
- Document Clearing of Beaver Activity
- Incorporate Data into Hazard Mitigation Plans
- Incorporate Crossing Replacement into CIP Plans

## **REPORT RECOMMENDATIONS**

### **Regional Recommendations:**

- (SNHPC) Assist Communities in Public Outreach and Awareness of Stream Crossing Hazards
- Incorporate Findings of Vulnerability Assessment into Future Land Development Studies
- Coordinate with Regional Long-Range Infrastructure Planning & Capital Investments
- NH DES Coordination / NH DOT Outreach



# **Presentation Overview**

1. 2020 Vulnerability Assessment Report
- 2. Public Comment on the Draft Report**
3. Recommendation for Action



## **PUBLIC COMMENT ON DRAFT REPORT**

### **Period for Public Comment:**

- Thirty (30) Day Public Comment (in line with PIP)
- Opened April 20<sup>th</sup>, / Closed May 21<sup>st</sup>
- One Response Received from NH Geological Survey
  - Request for Clarification of “Small Bridge” terminology
  - Comment on the draft nature of early ponding analysis
  - Reference to NHDES Vs. NHGS in body of report
  - Comment on the nature of the Streamworks-TU model
  - Comment on labeling “Flood Hazards Geodatabase”



## **Presentation Overview**

1. *Assessment Activity & Scope*
2. *Outputs of Assessment Activity*
3. **Recommendations for Action**



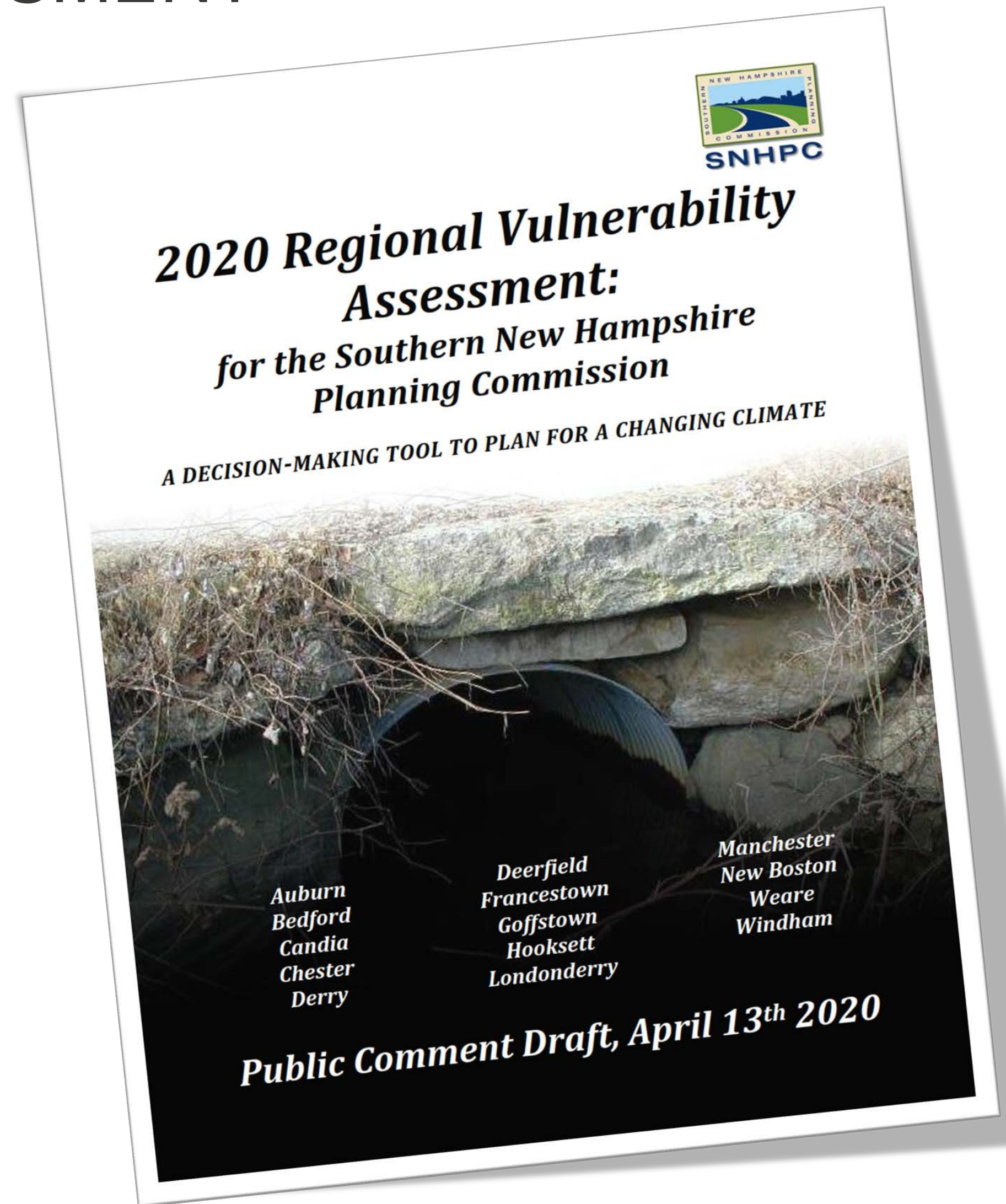


# VULNERABILITY ASSESSMENT

FULL REPORT

## TAC Action:

- Seeking a vote...
- Adopt of the 2020 Regional Vulnerability Assessment



SOUTHERN NH  
PLANNING COMMISSION



## QUESTIONS & COMMENTS

FEEL FREE TO CONTACT US ANYTIME

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